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EXAMINER	
LI, SHI K	

ART UNIT	PAPER NUMBER
2633	

DATE MAILED: 09/08/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/735,574	YOO, SUNG-JOO BEN	
	Examiner	Art Unit	
	Shi K. Li	2633	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *23 June 2005*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-17 and 21-26* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-17 and 21-26* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 112

1. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

2. Claims 12-14 and 25 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. Claim 12 recites the limitation "performed at each of a plurality of nodes in a network" in lines 1-2 of the claim. However, the specification as originally filed does not teach the limitation associated with the packet switching method recited in claim 12. Therefore, the limitation is considered as new subject matter.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

4. Claims 4 and 12-13 are rejected under 35 U.S.C. 102(e) as being anticipated by Qiao (U.S. Patent Application Pub. 2002/0109878 A1).

Qiao teaches in paragraph [0015] a backbone network consisting of label optical burst switched (LOBS) nodes. Qiao teaches in paragraph [0021] that a control packet is transmitted over a control wavelength along the same physical route as that to be taken by an associated burst along the LOBS path. The burst is transmitted after an offset time. Qiao teaches in paragraph [0022] and FIG. 1 that an intermediate LOBS node receives control packet, processes the control packet for determining a switching path and switches the burst when it arrives without converting it to electrical form.

Regarding claim 12, Qiao teaches in paragraph [0026] that the LOBS also specifies a wavelength based on the route.

Regarding claim 13, Qiao teaches in paragraph [0002] to use fiber for connecting nodes.

5. Claims 15-16 are rejected under 35 U.S.C. 102(e) as being anticipated by Johnston (U.S. Patent Application Pub. 2003/0016671 A1).

Johnston teaches in FIG. 1 that in a WDM network with N wavelengths, wavelengths 1 to N-1 are used for data and wavelength N (control wavelength) is used for control. The data frames of Johnston are equivalent to data packets of instant claim (see paragraph [0008]). That is, Johnston teaches to send signaling information for a first frame in control wavelength and the first frame in wavelength 1. Also Johnston teaches in FIG. 1 that the control frame is ahead of the corresponding data frame by a time interval of one frame. Johnston teaches in paragraph [0014] that the switch switches data frames without converting them to electrical form.

Regarding claim 15, label portion of instant claim is equivalent to control information of Johnston.

Regarding claim 16, Johnston teaches in paragraph [0002] fiber optical communications networks.

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

7. Claims 1-2 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sotom et al. (U.S. Patent 5,896,212) in view of ITU-T G.692 (ITU-T G.692, "Optical Interfaces for Multichannel Systems with Optical Amplifiers", October 1998, pp. 14-16).

Sotom et al. discloses in FIG. 1 a WDM network comprising a number of nodes. Each node sends packets to the network controller with packets in one of a plurality of data wavelengths (channels) and control information (signaling signal of instant claim) in a control wavelength (signal wavelength of instant claim). The network controller detects the control information and controls a space switch to switch data packets according to the control information. Regarding claim 1, the difference between Sotom et al. and the claimed invention is that Sotom et al. does not teach that the data wavelengths and the control wavelength are in two different transmission band. ITU-T G.692 teaches in Annex A wavelength assignment for data channels and in Annex B wavelengths for the optical supervisory channel (OSC). The data channels are in the range of 1529 nm to 1561 nm. This is usually referred to as the 1550 nm band. See, e.g., Bartee ("Digital Communications" Edited by Thomas Bartee, SAMS, 1986, pp 8-11). The OSC can be of wavelength 1480 nm or 1310 nm. One of ordinary skill in the art

would have been motivated to combine the teaching of ITU-T G.692 with the WDM network of Sotom et al. because conformance to international standard ensures compatibility and interoperability between equipment and facilities. Thus it would have been obvious to one of ordinary skill in the art at the time the invention was made to use 1550 nm band for data and 1310 nm band for control information, as taught by ITU-T G.692, in the WDM network of Sotom et al. because conformance to international standard ensures compatibility and interoperability between equipment and facilities.

Regarding claim 2, Sotom et al. teaches in FIG. 2 that a first node sends first packet on data wavelength $\lambda 1$ and a second node sends packet on $\lambda 2$, etc. All nodes send control information via the control wavelength λc.

8. Claims 1-2, 17, 21-22 and 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Johnston (U.S. Patent Application Pub. 2003/0016671 A1) in view of ITU-T G.692 (ITU-T G.692, "Optical Interfaces for Multichannel Systems with Optical Amplifiers", October 1998, pp. 14-16).

Johnston has been discussed above in regard to claims 15-16. Regarding claims 1 and 17, the difference between Johnston and the claimed invention is that Johnston does not teach that the data wavelengths and the control wavelength are in two different transmission band. ITU-T G.692 teaches in Annex A wavelength assignment for data and in Annex B wavelengths for the optical supervisory channel (OSC). The data channels are in the range of 1529 nm to 1561 nm. This is usually referred to as the 1550 nm band. The OSC can be of wavelength 1480 nm or 1310 nm. One of ordinary skill in the art would have been motivated to combine the teaching of ITU-T G.692 with the WDM network of Johnston because conformance to

international standard ensures compatibility and interoperability between equipment and facilities. Thus it would have been obvious to one of ordinary skill in the art at the time the invention was made to use 1550 nm band for data and 1310 nm band for control information, as taught by ITU-T G.692, in the WDM network of Johnston because conformance to international standard ensures compatibility and interoperability between equipment and facilities.

Regarding claim 2, Johnston teaches to send signaling information of a second frame in control wavelength and the second frame in another wavelength, e.g., wavelength 2.

Regarding claims 21-22 and 26, ITU-T G 692 teaches to use 1310 nm for control wavelength and 1550 nm for data wavelengths.

9. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Johnston and ITU-T G.692 as applied to claims 1-2, 17, 21-22 and 26 above, and further in view of Mani et al. (U.S. Patent 6,826,164 B2) and Rowan et al. (U.S. Patent 6,529,303 B1).

Johnston and ITU-T G.692 have been discussed above in regard to claims 1-2, 17, 21-22 and 26. The difference between Johnston and ITU-T G.692 and the claimed invention is that Johnston and ITU-T G.692 do not teach to use RF signals for control information. In other words, Johnston teaches to use TDM for multiplexing control information of different data wavelengths while the instant claim uses FDM for multiplexing control information of different data wavelengths. Mani et al. teaches in col. 6, line 61 to col. 7, line 8 that TDM and FDM are equivalent methods for subdividing an optical wavelength into multiple channels. Rowan et al. teaches in FIG. 8, FIG. 9 and FIG. 10 to use frequency division multiplexing technique for combining a plurality of data signals into a single wavelength. For example, Rowan et al. teaches in FIG. 9B to modulate carriers of 576 MHz, 1152 MHz, etc. to combine 8 signals

together using FDM technique. One of ordinary skill in the art would have been motivated to combine the teaching of Mani et al. and Rowan et al. with the modified WDM network of Johnston and ITU-T G.692 because FDM technique allows expansion by adding more carriers while expansion for TDM requires changing existing components with components of higher clock rate. Therefore, expanding a FDM system for more channels is easier than expanding a TDM system. Thus it would have been obvious to one of ordinary skill in the art at the time the invention was made to use FDM for multiplexing control information for a plurality of data packets, as taught by Mani et al. and Rowan et al., in the modified WDM network of Johnston and ITU-T G.692 because expanding a FDM system is easier than expanding a TDM system.

10. Claim 5-6, 14, 23 and 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Qiao (U.S. Patent Application Pub. 2002/0109878 A1) in view of ITU-T G.692 (ITU-T G.692, "Optical Interfaces for Multichannel Systems with Optical Amplifiers", October 1998, pp. 14-16).

Qiao has been discussed above in regard to claims 4 and 12-13. The difference between Qiao and the claimed invention is that Qiao does not teach that the data wavelengths and the control wavelength are in two different transmission band. ITU-T G.692 teaches in Annex A wavelength assignment for data and in Annex B wavelengths for the optical supervisory channel (OSC). The data channels are in the range of 1529 nm to 1561 nm. This is usually referred to as the 1550 nm band. The OSC can be of wavelength 1480 nm or 1310 nm. One of ordinary skill in the art would have been motivated to combine the teaching of ITU-T G.692 with the WDM network of Qiao because conformance to international standard ensures compatibility and interoperability between equipment and facilities. Thus it would have been obvious to one of

ordinary skill in the art at the time the invention was made to use 1550 nm band for data and 1310 nm band for control information, as taught by ITU-T G.692, in the WDM network of Qiao because conformance to international standard ensures compatibility and interoperability between equipment and facilities.

11. Claims 7, 9-11 and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sotom et al. and ITU-T G.692 as applied to claims 1-2, 14 and 25 above, and further in view of Li et al. (B. Li et al., "Low-Loss 1x2 Multimode Interference Wavelength Demultiplexer in Silicon-Germanium Alloy", IEEE Photonics Technology Letters, Vol. 11, No. 5, May 1999).

Sotom et al. and ITU-T G.692 have been discussed above in regard to claims 1-2. Regarding claim 7, the difference between Sotom et al. and ITU-T G.692 and the claimed invention is that Sotom et al. and ITU-T G.692 do not teach a multi-mode interference filter for demultiplexing. Li et al. discloses in FIG. 1 a multimode interference (MMI) demultiplexer where WDM signal received from the input port is separated into 1.3 μm and 1.55 μm bands at the two output ports. One of ordinary skill in the art would have been motivated to combine the teaching of Li et al. with the modified WDM network of Sotom et al. and ITU-T G.692 because the device of Li et al. is easy to fabricate and has low insertion losses and high extinction ratio at 1.3 μm and 1.55 μm (p. 575, left col., last sentence). Thus it would have been obvious to one of ordinary skill in the art at the time the invention was made to use the MMI wavelength demultiplexer of Li et al. in the modified WDM network of Sotom et al. and ITU-T G.692 because the device of Li et al. is easy to fabricate and has low insertion losses and high extinction ratio at 1.3 μm and 1.55 μm.

Regarding claims 9 and 24, ITU-T G 692 teaches to use 1310 nm for control wavelength and 1550 nm for data wavelengths.

Regarding claim 10, ITU-T G.692 also teaches to use 1480 nm for control channel. 1480 nm and 1550 nm are in the same fiber transmission band.

Regarding claim 11, Sotom et al. teaches in FIG. 4 buffer memory 15 for delaying data packets before switching.

12. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Sotom et al., ITU-T G.692 and Li et al. as applied to claims 7, 9-11 and 24 above, and further in view of Mani et al. (U.S. Patent 6,826,164 B2) and Rowan et al. (U.S. Patent 6,529,303 B1).

Sotom et al., ITU-T G.692 and Li et al. have been discussed above in regard to claims 7, 9-11 and 24. The difference between Sotom et al., ITU-T G.692 and Li et al. and the claimed invention is that Sotom et al., ITU-T G.692 and Li et al. do not teach to use RF signals for control information. In other words, Sotom et al. teaches to use TDM for multiplexing control information for different data wavelengths while the instant claim uses FDM for multiplexing control information for different data wavelengths. Mani et al. teaches in col. 6, line 61 to col. 7, line 8 that TDM and FDM are equivalent methods for subdividing an optical wavelength into multiple channels. Rowan et al. teaches in FIG. 8, FIG. 9 and FIG. 10 to use frequency division multiplexing technique for combining a plurality of data signals into a single wavelength. For example, Rowan et al. teaches in FIG. 9B to modulate carriers of 576 MHz, 1152 MHz, etc. to combine 8 signals together using FDM technique. One of ordinary skill in the art would have been motivated to combine the teaching of Mani et al. and Rowan et al. with the modified WDM network of Sotom et al., ITU-T G.692 and Li et al. because FDM technique allows expansion by

adding more carriers while expansion for TDM requires changing existing components with components of higher clock rate. Therefore, expanding a FDM system for more channels is easier than expanding a TDM system. Thus it would have been obvious to one of ordinary skill in the art at the time the invention was made to use FDM for multiplexing control information for a plurality of data packets, as taught by Mani et al. and Rowan et al., in the modified WDM network of Sotom et al., ITU-T G.692 and Li et al. because expanding a FDM system is easier than expanding a TDM system.

Response to Arguments

13. Applicant's arguments filed 23 June 2005 have been fully considered but they are not persuasive.

The Applicant argues that Johnston is not prior art to the present application. The Examiner disagrees. Johnston claims the benefit of priority to U.S. Provisional Patent Application 60/292,875 filed May 23, 2001. Specification of 60/292,875 includes FIG. 1 which contains same subject matter of FIG. 1 of Johnston. Specification of 60/292,875 teaches on page 2, last paragraph, "The switch (or router in this case) will perform an optical to electrical conversion only on the wavelength designated for the header information. All other wavelengths will be switched without conversion to electronic form." which is relied upon for the rejection. That is, the Provisional Application 60/292,875 supports the subject matter used to make the rejection and the rejection is proper (see MPEP 706.02(f)(1)).

Regarding the rejection of claims 1 and 2 under 35 U.S.C. 103(a) as being obvious over Sotom in view of ITU-T G.629, the Applicant argues that there is no suggestion that the 1550 nm data band of ANNEX A of ITU-T G.692 be combined with the 1310 nm OSC of ANNEX B.

The Examiner disagrees. ITU-T G.692 defines 1310 nm as a standard wavelength for OSC and 1550 nm band for data. The wavelengths are chosen because of their low attenuation and because it is easy to separate the 1310 nm wavelength from the 1550 nm band using CWDM technique. The entire ITU-T G.692 document is included in this Office Action per Applicant's request.

Regarding the rejection of claims 1, 2, 17, 21-22 and 26 under 35 U.S.C. 103(a) as being obvious over Johnston in view of ITU-T G.692, the Applicant argues that Johnston is improperly cited as prior art and ITU-T G.692 contains no suggestion for using different transmission bands for data and control information. The Examiner disagrees. Johnston claims the benefit of priority to U.S. Provisional Patent Application 60/292,875 filed May 23, 2001. Specification of 60/292,875 includes FIG. 1 which contains same subject matter of FIG. 1 of Johnston. Specification of 60/292,875 teaches on page 2, last paragraph, "The switch (or router in this case) will perform an optical to electrical conversion only on the wavelength designated for the header information. All other wavelengths will be switched without conversion to electronic form." which is relied upon for the rejection. That is, the Provisional Application 60/292,875 supports the subject matter used to make the rejection and the rejection is proper. ITU-T G.692 defines 1310 nm as a standard wavelength for OSC and 1550 nm band for data. ITU-T G.692 may not explain rationale for choosing these wavelengths. However, ITU-T G.692 is an international standard. One of ordinary skill in the art would have been motivated to follow international standard because it ensures compatibility and interoperability between equipment and facilities.

Regarding the rejection of claims 7, 9-11 and 24 under 35 U.S.C. 103(a) as being obvious over Sotom and ITU-T G.692 and further in view of Li et al., the Applicant argues that to date, no art has been provided suggesting that the data and control signals be separated into Li's two wavelengths of 1300 nm and 1550 nm. The Examiner disagrees. ITU-T G.692 teaches to use 1500 nm band for data signal and 1300 nm band for control signal.

Conclusion

14. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Shi K. Li whose telephone number is 571 272-3031. The examiner can normally be reached on Monday-Friday (8:30 a.m. - 5:00 p.m.).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jason Chan can be reached on 571 272-3022. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

skl
31 August 2005

M. R. SEDIGHIAN
PRIMARY EXAMINER